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Reply to: 3420

Date: March 7, 1997

Subject: Forest health conditions, Converse Station and Converse Flats (FPM Report S97-1)

To: District Ranger, Mountaintop Ranger District, San Bernardino National Forest

On February 26, 1997, James Allison, Pathologist, and Laura Merrill, Entomologist, accompanied Ed Zeikus, Forester, on an inspection of some forest health problems Ed had observed at Converse Station and on Converse Flats. Following is a description of the problems observed and management options. The Converse Fire Station is located in a stand of large old Jeffrey pines and black oaks. Converse Flats, on the other hand, has approximately 100 acres of ca. 30-year-old plantations of penny pines, primarily Coulter pine, but with a smaller component of Jeffrey pine, giant sequoia, and cypress.

First we inspected a large (32 inch dbh) Jeffrey pine growing near the Converse Fire Station. The tree has poor needle retention, possibly from ozone damage, and is infected with dwarf mistletoe. The crown is very thin. Clear pitch was streaming from one spot on the upper bole, possibly as a result of acorn woodpecker or flathead borer activity. Acorn woodpeckers are abundant in the area, and flatheads commonly kill stressed Jeffrey pines in the San Bernardino Mountains. Nearby pines are also infected with dwarf mistletoe, and the tree is not adjacent to a structure. Options include doing nothing, in which case the tree may die in the next few to several years, felling the tree, or pruning out the dwarf mistletoe plants, leaving at least 30% of the live crown. The latter option would enhance the vigor of the tree and increase its chances of survival.

Next we inspected an area of smaller Jeffrey pines (average diameter was approximately 12 inches). These trees were growing in and around a wet meadow, and one or two trees die every year. There were some small black oaks growing within the meadow, and larger old black oaks in the vicinity. A dead 11 1/2 inch diameter tree had been attacked by bark beetles, most likely the Jeffrey pine beetle. James Allison inspected several pine stumps but was unable to confirm the presence of annosus root disease. Because of the difficulty of finding fruiting bodies of the fungus, it should not be assumed that the disease is **not** present at the site. However, the mortality may be associated with the high water table and not with a pathogen. If trees are planted within this potential annosus root disease center, only non- susceptible species, such as black oak, should be used.

Converse Flats is to the northwest of Converse Station in the Santa Ana River drainage. Overstory trees are Jeffrey and Coulter pines. The trees in the penny pine plantations were almost all growing vigorously. The plantations are presumed to have been established after a stand replacing fire, but records no longer exist. Different site preparation techniques were used in different plantations, and different levels of thinning have been applied over the years.

One 40-50 acre plantation was thinned at ca. 10 years of age, but now the crowns are closed and there is very little undergrowth, except in occasional openings. Site preparation for this plantation had consisted of bulldozing brush and slash into windrows. There were many deer and bear droppings in this plantation; thus it is extensively used by these species of wildlife. There was no mortality among the Coulter pines.

Another 11 acre plantation was established in an area where the site preparation consisted of disking. Heavier thinning has been done on this plantation, and there was heavy brush growth (whitethorn, yerba santa, and manzanita). There were a few small group kills consisting of one to several trees. Mortality was not recent enough to determine the cause, though bark beetles were most likely involved. One tree had many siricid (horntail) exit holes. Mortality was not extensive and did not appear to be at a level to cause concern. The District and Forest Vegetation Management Team are currently pruning the trees and removing brush by hand and will do an underburn to minimize the risk of catastrophic fire and to recycle nutrients. Management of pests on this and the previous site should consist of good forest management practices: maintaining an appropriate stocking level and controlling brush competition. Slash greater than three inches in diameter should be removed from the site, such as by a fuelwood sale, chipped, or otherwise treated as described in the attached "Guidelines for Treating Slash to Reduce Risks of Engraver Beetle Outbreaks." All conifer stumps should be treated with borax to prevent colonization by the fungus causing annosus root disease.

If further information is needed, please contact Forest Pest Management, Southern California Shared Service Area.

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GUIDELINES FOR TREATING SLASH
TO REDUCE RISKS OF ENGRAVER BEETLE OUTBREAKS

USDA Forest Service
Forest Pest Management, Region 5

Complacency in slash treatment --

"The threat of outbreaks posed by insects breeding in residues is generally overrated. Graham (1922) and Craighead et al. (1927) long ago concluded that the insect menace posed by slash is more theoretical than real. Entomologists today generally agree. However, it is well to treat ips with respect for the pine engraver problem associated with the creation of slash is unpredictable. There are years when no trees are killed, despite suitable slash and lots of beetles. These same conditions in other years lead to unacceptable tree mortality. Therefore, it is best to follow recommended practices and not to grow complacent because one has 'lucked out' for a couple of years."

The critical factor appears to be the vigor of the residual green trees in late summer. There generally is no tree mortality when precipitation in April, May and June is normal or greater; an 'ips year' occurs when precipitation in those key months is below normal. That, at least, is what general correlations suggest." (Dolph 1971)

A question facing foresters is whether the beneficial aspects of engravers aiding in residue fragmentation outweigh the reasons for removing residues.

SLASH TREATMENT

Broad statements are not possible. Considerations to be taken into account are 1) species of tree, 2) character of slash, 3) species of insect involved.

Concern: 1) Slash attracting insects from the surrounding forest and concentrating them in the vicinity of the slash, where they kill living trees; 2) slash supplying breeding material for insects which emerge and kill mature standing timber or seedlings, saplings and poles.

The main concern is slash from PINE, SPRUCE and DOUGLAS-FIR.
The slash of fir, larch, redwood, hemlock, cypress, cedar and juniper either breeds insects of very little significance as tree killers, or the trees killed are so few or of so little value as to be of small economic importance.

PINE

BEST	All lopped and exposed to sun.	< # of beetles produced
|	Only vertical limbs lopped.	|
|	Unlopped.	|
WORST	Lopped and piled.	> # of beetles produced

Worst time to create slash -- January to mid-July.

A. Prompt Slash Disposal

Dozer trampling (crushing); disking and trampling = chopping
Chipping
Plastic "Greenhouse"
Lopping (limbing)
Lop and scatter
Burning
Burying
Removal

B. Prompt Slash Disposal Impractical

Where general slash disposal is impractical, scattering the slash into openings where it is exposed to direct sunlight dries it out faster, and dry slash is unsuitable for beetle development.

C. Green Chain Technique

A good pine engraver year is usually one in which:

a. the winter is abnormally dry,
b. warm weather lasts late into the fall and occurs early in the spring,
c. spring rains are few with long periods between what rains occur.

MATERIAL USUALLY NOT PRODUCING LARGE BROODS:

1. Lopped material less than 3 inches diameter
2. Very large logs
3. Material with bark > 1 in in thickness is seldom attacked (excluding unlopped tree tops).
4. Old, soured or partially dry slash. (The objective of slash disposal treatments is to create this type of slash before infestation).
5. Thinning slash is not particularly good breeding material, but it is often densely attacked. This aggregation of beetles can result in tree killing when the recent problems of severe competition and the shock of sudden exposure to full sunlight are compounded by drought.
6. Trees treated with silvicide and slash therefrom.

MATERIAL CONDUCIVE TO THE DEVELOPMENT OF LARGE BROODS OF ENGRAVERS.

1. Most productive -- stem portions of unlopped tree tops varying in basal diameter from 10-20 inches or more.
2. Piled green slash of any dimension.
3. Concentrations of freshly-cut slash on the ground in full or partial shade.
4. Unlopped tree tops and other slash and debris created from January through June.

5. Most important source of breeding material in logging slash is the main stem from about 3 inches and up.
6. The main stem of a top is potentially more dangerous than limbs, particularly if the limbs are severed.
7. Shading with miscellaneous logging debris will offset lopping and sunlight.
8. Slash 6 to 24 inches diameter cut after January 1.
9. Piled pine pulpwood or logs.
10. Pines girdled for understory release.
11. Branches and tops of pines broken off by snow.
12. Pines girdled by porcupines.
13. Suppressed pines.
14. Shaded slash and the underside of logs.

BEST MANAGEMENT PRACTICES.

Keep track of amount of slash laid down by windstorms
Check lightning stuck trees whenever a fresh strike is seen.
When practical, cut young-growth pine after 7/15.
Lop and scatter all slash -- expose main stem to sun.
Utilize to minimum top diameter practible.
Keep accumlations of slash or green logs away from living trees, and fell trees away from dense thickets of young-growth.
When necessary, kill broods by best means.
Prevent accumulation of felled material (avoid cutting practices, patterns, conducive to windthrow)
Alternate stand structure and species composition to reduce susceptibility.
Log infested and threatened stands -- 1st priority: stands with heavy populations and/or large volumes per acre.
Remove dead and infested trees from campgrounds before emergence.
Surveillance (monitoring) -- not treatment is necessary if there are few beetles. - reddish boring dust on upper surfaces and on ground under slash
- Y, I, or H-shaped egg galleries; Y-shaped most common.
- no pitch tubes
Salvage windthrows as soon as possible.
Residue treatments to minimize damage is most effective if applied before the thinning slash is attacked.
In high risk areas, such as campgrounds, use method(s) that prevent aggregation of many attacking beetles in proximity to residual trees.
Avoid trimming along power lines and other rights-of-way, running logging equipment over root systems of residual trees (designate skid trails), or other practices which may injure trees during periods of hot dry weather.
Destroy slabs from portable sawmills operating in forested areas.
Do not leave any ponderosa pine slash in a position that will prevent it from drying out quickly. When slash must be piled, plan to do it after mid-October, or treat by chipping or some other destructive method.
Intensive utilization and clean logging -- eliminate much of the slash and make it possible to more efficiently and effectively treat the slash in fuel and insect management.
Slash piled or bunched for burning or for wildlife habitat should be allowed to dry before the piling opertion.

AVOID THESE WORST MANAGEMENT PRACTICES:

Piling fresh slash in any season without further treatment.
Letting slash or green logs accumulate near living trees.
Piling bucked limbs and cull logs along any forested roadside for fuelwood without prior treatment.
Windrowing fresh slash without drying (or partial drying).
Sporadic cutting in the spring of the year, with the slash unlopped and unscattered.
Removal of infested material to developed areas where emerging beetles can attack high value trees that may be stressed by improper site manipulations.
Piecemeal treatments -- measures to suppress beetle populations in thinning residues will minimize damage only if applied comprehensively on a regular basis.
Piling fresh slash adjacent to standing trees.

Best recommendation: Prevent stagnated or highly competitive growth conditions in stands.

Brood Material --

Man-caused
- pine logging slash
- pines damaged during logging of other trees
- fire-damaged pines
- pine pulpwood or log piles
- right-of-way clearing slash
- pines girdled for understory release

Natural
- trees weakened by other insects or other factors
- branches and tops of pines broken off by snow
- pines girdled by procupines
- pines suppressed from competition
- diseased pines

Soils at field capacity at the beginning of the growing season will be nearly exhausted of moisture reserves by late July and early August if rainfall is below normal. Coincidentally, it is during this period that adult pine engravers are emerging at a fairly constant rate. However, moisture stress alone will not normally induce an outbreak. Stress must be coupled with brood material to provide the population increase necessary to produce tree killing.

Thinning after June 15: most available soil moisture is used and thinning will not provide any additional moisture for the residual stand. What you will get is increased soil temperatures and a higher evapo-transpiration stress.

Two situations which should be avoided at all seasons are piling fresh pine slash without further treatment, and allowing slash or green logs to accumulate near living trees.

California five-spined ips --

Beetles begin to emerge from spring-infested debris about the same time that trees first experience moisture stress and the result can be considerable tree mortality in nearby stands.

Even in areas where pines are few, pine slash can be heavily infested.

LITERATURE CITED

Dolph, R.E. 1971. Oregon pine ips infestation from red slash to green trees. In D.M. Baumgartner (Ed.) Precommercial thinning of coastal and intermountain forests in the Pacific Northwest, pp. 53-62. Washington State University, Pullman, WA.